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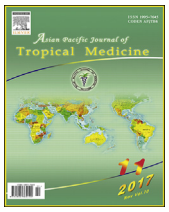

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Evaluating the effect of *Myrtus communis* on programmed cell death in hydatid cyst protoscolices

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ABSTRACT

Objective: To evaluate the possible involvement of programmed cell death strategy in hydatid cyst protoscolices following treatment with *Myrtus communis* (*M. communis*) as an herbal medicine.

Methods: Protoscolices were aseptically collected from sheep liver hydatid cysts. Evaluating the effect of *M. communis* extract on programmed cell death and increased activity of caspases 3, 8, and 9 in hydatid cyst protoscolices was conducted by treating the protoscolices with different concentration (5, 50, and 100 mg/mL) of *M. communis* extract at 37 °C and 5% CO_2 for 4 h by using the Bradford test and ELISA commercial kits.

Results: The extract of *M. communis* at all concentrations led to initiation of programmed cell death in protoscolices and this effect, was only significant at 50 and 100 mg/mL concentrations, compared to the negative control ($P < 0.05$). Also, the activity of caspases 3, 8, and 9 in hydatid cyst protoscolices, was shown that the extract at all 3 concentrations could only increase the activity of caspases 3 and 9. Moreover, a significant increase in the activity of caspase 3 was only observed at concentrations 50 and 100 mg/mL by 37.00% and 66.19% while a significant increase in the activity of caspase 9 at the same concentrations was observed by 20.89% and 63.67%, respectively ($P < 0.05$).

Conclusions: The extract of *M. communis* at different concentrations could increase the activity of caspases 3 and 9 and caused programmed cell death in hydatid cyst protoscolices however, this effect was significant at high concentrations of the extract.

1. Introduction

Hydatidosis is a zoonotic disease caused by larval stage of *Echinococcus granulosus* and its final localization in different organs of the human body such as liver, lung, and brain. The major hosts of this parasite are dogs and carnivores; herbivores as intermediate hosts; and human as accidental intermediate host. This disease is widely distributed and remains a health concern globally and has important economic consequences [1–4]. Surgery is the most effective therapeutic approach and the choice of less harmful but potent protoscolicidal agents before surgery and the injection of such compounds into the cysts decrease the risk of leakage by viable protoscolices and is of vital importance for the surgeons [5–7]. At present, the application of herbal medicines as substitutions for chemical compounds has gained growing acceptance and credibility [8] and some of these herbal plants

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